

CLAIMS

What is claimed is:

1. A method for measuring a medical substance contained in a sample using resonance phenomenon resonating with an evanescent wave, said method comprising the following five steps of:

(1) first step:

5 preparing a conjugated protein antigen where a protein and a medical substance, which is identical to the medical substance to be detected, are conjugated;

(2) second step:

fixing said conjugated protein antigen to a resonance material wherein a resonance phenomenon is caused to resonate with an evanescent wave;

10 (3) third step:

preparing an antibody, which is coupled to said conjugated protein antigen fixed onto said resonance material in a specific manner;

bringing a solution containing said antibody in contact with the resonance material to which said conjugated protein antigen has been fixed;

15 making a light incident upon said resonance material to cause a resonance phenomenon;

detecting a reference change of the incident light or a reference change of a reflected light thereof when said resonance phenomenon is generated;

(4) fourth step:

20 preparing a sample, which contains both a medical substance to be detected and said antibody,

bringing said sample in contact with the resonance material to which said conjugated protein antigen has been fixed;

25 making a light incident upon said resonance material to cause a resonance phenomenon;

detecting a comparative change of the incident light or a comparative change of a reflected light thereof when said resonance phenomenon is generated;

(5) fifth step:

30 recognizing an amount of medical substance contained in said sample on the basis of a difference between said reference change of the incident light or the reflected light and said comparative change of the incident light or the reflected light.

2. A method for measuring a medical substance according to Claim 1, wherein said resonance phenomenon is a surface plasmon resonance phenomenon.

3. A method for measuring a medical substance according to Claim 1, wherein said protein is a bovine serum albumin.

4. A method for measuring a medical substance according to Claim 3, wherein said medical substance to be detected is morphine.

5. A method for measuring a medical substance according to Claim 3, wherein said medical substance to be detected is methamphetamine.

6. An apparatus for measuring a medical substance contained in a sample using a resonance phenomenon resonating with an evanescent wave in accordance with a method mentioned in Claim 1, said apparatus, comprising;

5 a resonance phenomenon generating section having a resonance material; and a detecting means for detecting a change of an incident light which is made incident upon said resonance material to generate said resonance phenomenon or a change of a reflected light thereof; and

wherein said conjugated protein antigen having a reacting site, which is almost identical to that of the medical substance to be detected, is fixed to said resonance material.

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7. An apparatus according to Claim 6, wherein said change to be detected by said detecting means is an incident angle of said light being made incident upon said resonance material when an intensity of the reflected light thereof is decreased.

8. An apparatus according to Claim 6, wherein said change to be detected by said detecting means is a wavelength or a wave number of said reflected light when an intensity of said reflected light is decreased.
9. An apparatus according to Claim 6, wherein said change to be detected by said detecting means is an intensity of said reflected light when the incident light is made incident upon said resonance material with a predetermined incident angle.
10. An apparatus according to Claim 6, wherein said change to be detected by said detecting means is an incident angle of said incident light when a phase of said reflected light is varied.
11. An apparatus according to Claim 6, wherein said resonance phenomenon is a surface plasmon resonance phenomenon.
12. An apparatus according to Claim 11, wherein said resonance phenomenon generating section comprises a prism having a high refractive index, a thin metal film directly or indirectly formed on one of the surfaces of said prism as said resonance material, and a light source for making a light incident upon said metal film via said prism, wherein a conjugated protein antigen having a reacting site, which is almost identical to that of the medical substance to be detected, is fixed to another surface of said metal film which is opposite to the surface on which said prism is formed.
13. An apparatus according to Claim 12 further comprising a calculating means for recognizing an amount of said medical substance contained in said sample in accordance with the change detected by said detecting means.
14. An apparatus according to Claim 6, wherein said protein is a bovine serum albumin.
15. A medical substance sensor for use in an apparatus for measuring a medical substance contained in a sample using a resonance phenomenon resonating with an evanescent wave

comprising a resonance material where a resonance phenomenon is caused to resonate with
an evanescent wave, wherein a conjugated protein antigen having a reacting site, which is
5 almost identical to that of the medical substance to be detected, is fixed to said resonance
material.

16. A medical substance sensor according to Claim 15 further comprising a prism having a
high refractive index, a thin metal film which is directly or indirectly formed on one of the
surfaces of said prism as said resonance material, wherein a protein constituting said
conjugated protein antigen is a bovine serum albumin.